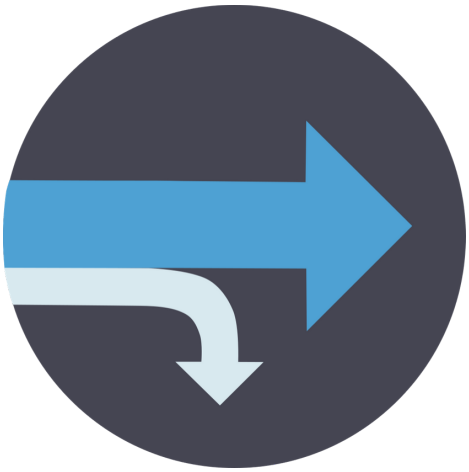
Energy Modelling Initiative – Initiative de modélisation énergétique

Bringing the Tools to Support Canada's Energy Transition– Outiller le Canada pour réussir la transition

EMI National Forum 2019 – Synthesis Report



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Natural Resources Canada Ressources naturelles Canada
Canada

INSTITUT DE L'ÉNERGIE TROTTIER

POLYTECHNIQUE MONTRÉAL

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Energy Modelling Initiative's National Forum 2019 – Synthesis Report

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Acknowledgements

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About the Institut de l'énergie Trottier (IET)

The IET was created in 2013 thanks to a generous donation from the Trottier Family Foundation. Its mission is to train a new generation of engineers and scientists with a systemic and trans-disciplinary understanding of energy issues, to support the search for sustainable solutions to help achieve the necessary transition, to disseminate knowledge, and to contribute to societal dialogue on energy issues. Based at Polytechnique Montréal, the IET team includes professor-researchers from HEC, Polytechnique and Université de Montréal. This diversity of expertise allows IET to assemble work teams that are trans-disciplinary, an aspect that is vital to a systemic understanding of energy issues in the context of combating climate change.

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Contents

1. Introduction

The Energy Modelling Initiative has been mandated by Natural Resource Canada to the Institut de l'énergie Trottier at Polytechnique Montreal with the primary goal of fostering synergies and collaboration among stakeholders of energy modelling community, mainly through convening and facilitating dialogue.

Key deliverables of EMI include selected modelling project reports, an inventory of Canadian Energy Modelling expertise, a series of workshops to convene the community, a report of the value of existing capabilities and a long-term plan for institutionalizing this pilot program and sustainably maintain the community.

Convening a national forum of energy modelling stakeholders has been one of the key tasks that would set the stage for the delivery of several EMI objectives. Nonetheless, the focus of the EMI National Forum has been to build on these insights to shape the long-term plan in consultation with the Canadian Energy Modelling Community; as such, a draft of the EMI long term plan has been front and center of the Initiative.

The agenda (Annex 1) has been designed around the prospects and requirements for a long-term plan to establish and nurture a Canadian Energy Modelling Network. Over two days, energy modelling stakeholders came together to engage with:

panels of model users and modellers about their challenges and needs, the summary of conversations started at regional workshops, linkage initiatives to understand EMI's institutional ecosystem, selected modelling projects and a glimpse of vast body of information collected for the inventory and, elements of the draft long-term proposal to contribute to its shaping by providing feedback.

For each section of the event, guiding questions had been designed and shared with participants through the agenda ahead of time to focus the conversation. Hence, the discursive trajectory of the event has been focused towards its core task of soliciting feedback about the long-term proposal.

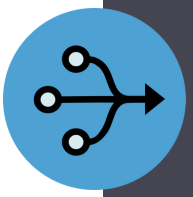
On this basis, this report will draw the insights together to synthesize the findings from each section. A summary of modelling projects and information about the inventory will be provided in an annex. It has been ordered based on the structure of sections. Each sub-section will deliver a synthesis of a) converging positions, b) diverging positions and c) other highlights.

2. Panels

Following the successful exercises in the three regional workshops, two panels were set up to represent a focus group from two important categories (poles of the spectrum) of stakeholders: users and developers of models. Each panel was directed through a set of questions to reflect upon the long-term proposal and the interaction of their organization (representing a stakeholder group) with the initiative.

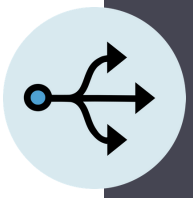
2.1. Panel 1: Context and Expectations of EMI

The first panel sought to summon a focus group of model users, included a representative from federal and provincial governments, a utility, a generator association and a non-profit institution.



Convergence: Generally, it was agreed upon that…

- Independent modellers are key to bringing transparency, credibility and trust in choices, particularly in policy making but also for economic investments.
- EMI's greatest contributions is through convening and facilitate interactions, exchange and engagement.
  - Andre Bernier: "Defining the contours of issues and opting for the realistic are ideal outcomes" of the discussions.
- EMI should be a space for co-creating solutions.
- Modelling efforts should go beyond the electricity towards broader energy systems.
- Timeliness is a key value that can act as a barrier between users and developers.
- EMI operations can only be effective if they're sustained.
- Better to remain neutral towards political objectives and focus on supporting fact-based decision making.



Divergence: There were also some disagreements

- Some conceived a risk of the conventions in facilitating competitive discrediting. Others found to the contrary that conventions will be "touching points for the effectiveness of the models" and that criticism validates credibility.
- Among the greatest challenges of the initiative are:
  - encouraging a collaborative spirit,
  - confidentiality and propriety of the information,
  - balancing stability, depth and flexibility,
  - benchmarking data accessibility.

Highlights

- EMI needs to be a "nimble, efficient and well integrated in the Canadian efforts, appropriate to institutional infrastructure" Andre Bernier.
- Opportunities to collaborate with utilities to validate or correct their findings, update and adapt their models and contribute in building a virtual grid.
- Utilities, the generators, the transmission operators, the distribution operators
- Provincial and municipal government are the most strategic stakeholders to engage.
- Absence credible facts, policy decisions are often driven by private sector interests.

2.2. Panel 2: Towards a common platform

The second panel sought to summon a focus groups of model developers. It included representatives from government, academia, NGO, and the private sector.

Convergence

- The main task of the EMI should be convening and "de-silo-ing" the Canadian modelling community: The greatest contribution of the EMI is coordinating the network of modellers and update its inventory thereof.
- Policy makers often have long term commitments with modellers but interested in comparing results to enhance credibility and build trust in their choices.
- Policy makers need to engage in defining the problems more clearly in terms that modellers can approach.
- An important achievement of the initiative would be a shared set of assumptions of reference scenarios.
- Focus of modelling should be the clients (users, decision makers).

Divergence

- Whereas most of everyone agreed that the main role of EMI is to coordinate the network, some were in favor of a more active "management" approach to pull the expertise together and introduce standardization to facilitate access.
- Whereas most participants could see the value of the neutral vision, some suggested the oriented vision more accurately reflects the real ambition that has shaped EMI.
- There was some sympathy with the perspective from the first panel about how diversity of models and difference in results could undermine trust in models. Others suggested that given the complexity of models, trust is often placed in people.

Highlights

- Key challenges of EMI:
  - Timeliness: ensure modelling can contribute to decision making IN TIME.
  - Finding the basic criteria to establish a neutral information system.
  - Accommodate a diverse range of interests.
- Modelling should be pursued beyond the electricity grid and include other areas such as energy efficiency, biomass, hydrogen etc.
- EMI should be a nimble, centralized initiative to define coherent and meaningful strategy to maintain and develop relevant energy modelling expertise.

3. Presentations

Regional partners of the EMI which organized the regional workshop delivered a presentation of their synthesis reports. Linkage initiatives which are closest to EMI in its ecosystem also presented their work and how it relates and contributes to the work of EMI.

3.1. Workshops

3.1.1. Central

- Providing access to expertise. Encouraging collaborations through frequent multidisciplinary engagements such (more) workshops and forums, updated inventory, and incentives such as grants and awards.
- Making data publicly available while mitigating security and privacy concerns of utilities and system operators as well as intellectual property issues.
- Transcending interconnections of models and users in context of strong regional differences in Canada.

- A great challenge contemporary modelling in Canada is modelling consumer behaviours since historic data availability is limited (due to fast changing sectors with lack of history for adoption and uptake rates).
- The expectation from the common platform is to provide appropriate infrastructure for storing and sharing data and facilitating compatibility between models.

3.1.2. Western

- Policy makers struggle with short-term and long-term objectives: EMI needs to define and adjust the boundaries of the issues
- Greatest challenge on both sides is uncertainty around future costs, technological performance and demand.
- Policy makers expect modellers to incorporate market conditions in their work.
- Modellers struggle with presenting technically sophisticated material in comprehensible language.
- EMI is best positioned to address the lack of consistent interaction.
  - A Long-term institutional structure to sustain dialogue and provide resources.
- Other role and contribution of EMI: matchmaker, objective analysis, accessible models, training, reference source, data sharing, educational material.
- EMI challenge: Standardize the modelling-policy space and converge both sides.
- There are not enough modelling efforts for economic investors.
- Modellers struggle with lack of operational funding.
- A platform needs to provide a basic documentation for models, code for baseline models, and interconnection standards for models.

3.1.3. Atlantic

- There's a gap in communication within the community of modelling stakeholders.
- Policy makers are driven by financial and social aspects of policy implications; hence, interdisciplinary modelling is required to address their needs.
- Modelling involves uncertainty of results. Hence, policy making needs to be flexible to be able to use modelling outputs.

- Limited assumption lead to limited outputs (risk of unintended consequences).Greatest challenge: modelling relies on the technology that hasn't been invented yet.
- EMI needs to take account of all models and build comprehensive inventory.
  - Mobilize the network of energy modeller to solve policy problems.
  - Establish standard protocols to store and share data and connect models.
  - Increase trust between modellers and policy makers.
- Different models required for different kind of policies and regions.
- Greatest challenge: modelling relies on the technology that hasn't been invented yet.
- Lower income consumers should also be modelled.

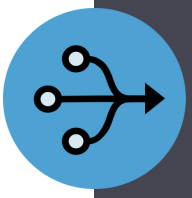
3.2. Canadian Center for Energy Information (Linkage Initiative)

- It's a Natural Resource Canada and Statistics Canada collaboration.
- Arms-length arbitrator of energy statistics with no ministerial involvement on methodology.
- Problems/context: conflicting, confusing, incoherent data sources, which makes it difficult finding Canadian data and substituting International data.
- Values: independence, centralization, integration, shared governance, minimize duplication and burden.
- Modelling and forecasting are part of the mandate and plan but not a priority:
  - Before June 2020, first products related to modelling to be up on the website.
  - Initially, consultations; then develop standards and documentation for consensus forecast.
- Linkage with EMI (shared tasks):
  - provide data access (open, standards, metadata, virtual labs),
  - fill the data gaps,
  - provide collaborative space,
  - standardize transparency,
  - provide interactive tools.

3.3. Canadian Institute for Climate Choices (Linkage Initiative)

- CICC is the link between facts and choices by providing analysis. It helps policy makers navigate policy pathways to low carbon, resilient prosperous future.
- Three focus areas of their work are mitigation, adaptation, clean growth.
- Research priorities:
  - What is the cost of climate change and of related policy choices?
  - What are the pathways to net-zero emissions?
  - What are the barriers to electrification?
  - How to measure progress?

4. Breakout 1: EMI Orientation



Convergence

- Municipals are one of the most important stakeholders with increasing interest in energy modelling. Indigenous government are also key stakeholders and need to be engaged.
- Most important contributions of EMI:
  - Convene the community and ensure interactive (not one way) interactions and communications.
  - Facilitate data access: coordinate and collaborate closely with CCEI. Provide formatting guidelines and protocols for sharing a data and results.
  - Balancing IP issues and transparency will be a key challenge of EMI.
  - Clustering the field of Canadian energy modelling, creating a taxonomy of building and updating an inventory of expertise; some suggested this is more important than picking and choosing models.
  - Establish criteria for usefulness of models.
  - Matchmake between modellers and users: keeping problems updated and articulated, defining standards etc.
  - Provide information and training for specific models.
  - Defining initial projects by engaging users to define their problems in terms that can be addressed by developers.
  - Provide public education services.
- To be effective, EMI needs to be sustainable and therefore needs to have secured resources for its operation.
- Most considered university-based institution to have more advantages for the purpose at hand, particularly n attracting a broader range of funding and being able to collaborate with a broader range of stakeholders.
- The most important value propositions are transparency, trust and usefulness.

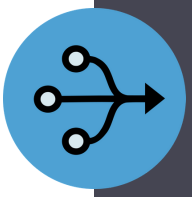
Divergence

- Even though many agreed that the neutral vision would be the most effective to shield EMI from political turmoil, there were notable concerns about the value of this initiative for the most urgent problem of our time (climate change) will be lost.
- Some suggested to add sustainability and drop decarbonization.
- Some considered the task of platform relatively lower in priority compared to convening the community. Nonetheless, some considered it curtail to share data and results.
- Some found the platform idea ambiguous and unmanageable to deliver.

Highlights

- Several suggested to take energy sector out of the mission statement.
- Some suggested to differentiate between long term and short-term goals of EMI: in the near-term, convening is the most important task whereas building a platform would be a long-term objective.
- It was suggested to have key stakeholders on broad (in the decision-making structure).
- Media has been found rather irrelevant to the work of EMI: that would be a concern for policy makers.
- It was suggested to consider students a key stakeholder groups since they will be the expertise that can be most shaped towards the objectives that EMI is pursuing for developing energy modelling expertise.
- Some suggested to focus vocabulary towards collaboration, co-creation and engagement instead of support.
- Some suggested that social science is an important discipline to contribute to energy modelling and thus should be involved.
- Some suggested the European Modelling Platform and the Stanford Energy Modelling Forum as two key benchmarks for EMI.
- Two outstanding suggestions for “values” to be added: fairness and mobilization.

5. Breakout 2: Towards a platform



Convergence

- Municipal and indigenous governments are key stakeholders and users of models.
- Multi-university model provides better access to funding, most resilient in political uncertainty.
- EMI's most efficient contributions:
  - Facilitate collaboration through conventions. EMI should organize both disciplinary (technical workshop for modellers) and cross disciplinary (modellers, users, intermediaries etc.) events.
  - EMI as matchmaker between developers and users. Most important tool: inventory. Create a taxonomy of models.
  - Facilitating data access and management: creating sharing protocols, standard and incentives while ensuring security and privacy issues. EMI could do collective bargaining for broadly needed resources.
  - Facilitate open source modelling.
  - Facilitate cross-model comparison and validations. Create protocols for daisy-chaining models.
- Broaden focus from electricity to other sectors like thermal and transportation
- Policy makers need to articulate the problem and present sample projects in their effort of engagement.
- Public education should also be part of EMI's mandate.

Divergence

Overall, the notion of "platform" has not been clear and well received.

- Same saw great values that a platform could create:
  - Interoperability, relatability: exchanging input, output: standardization vocabulary and meta-data for proprietary and open source models.
  - Automatic logs for trackability of operations increase transparency and trust.
- Some emphasized we should distinguish between short and long-term goals: platform is long term.
- Some preferred specified models, some general models.

Highlights

- A novel conception was that EMI could act as an intermediary for RFP communication and distribution.
- Some emphasized that EMI should focus on the Canadian brand and promote the engagement with and nurture local rather than rely on imports and across-the-boarder expertise.
- EMI should also engage industrial partners and align with their interest.
- EMI could also act as a broker of information or a library for models; EMI could be to models like CCEI is to data.
  - EMI could coordinate the creation of a “wish list” for data
  - Many data centers exist that need to be engaged and aligned with the initiative.
- EMI could coordinate Energy modelling summer school.

6. Conclusions

- The debate was polarized regarding the vision, whether it should be neutral or clearly oriented towards decarbonization:
  - The neutral vision was preferred for the preservation of the platform and its funding from political turmoil.
  - The oriented vision was preferred for fostering engagement and timeliness.
  - It was mostly agreed that sustianbility should be included.
- The multi-university option was clearly preferred to ease collaborations and attract a broader range of funding.
- EMI should broaden its focus from electrification to all pathways (entire energy sector).
- Instead of support, EMI vocabulary should focus on co-creation and collaboration.
- Policy makers are key stakeholders that also need to make efforts to engage with modellers by articulating their problems in terms approachable by modellers.
- Municipal and indigenous government are very strategic, although rather overlooked stakeholders of EMI. Students should also be considered key stakeholders.
- Different stakeholders have different interest and need to be engaged with different incentives. EMI must balance those incentive structures for maximum contributions.
  - EMI should include key stakeholder in its decision-making structure.
- The greatest value of the EMI should be transparency which is the key to confidence and trust in decision making. Others include engagement, outcomes, adaptability, security, timeliness and a sense of emergency.
- Access to models and data must be made easier to prevent duplication of work and enable cross-validation and peer review.
- The inventory of Canadian models could play a key role to position EMI as a matchmaker between modellers and users (de-silo-ing the modelling stakeholders). EMI should create a taxonomy of Canadian models.
- EMI should also establish criteria of usefulness for models and select accordingly.
- An effective role for EMI could be to act as intermediary of modelling related RFPs.
- Issues/decisions that can be assessed with modelling span a broad range of subjects.
  - Some of the most important ones include pathway analysis (costs, emissions resilience etc.), transportation, electricity grids, storage options, demand estimations, biogas, remote and off grid communities etc.

Creating of a platform is only feasible as a long-term goal. It could facilitate storing and sharing data/scenarios and compatibility/exchange of models through standardization.

- EMI should be a nimble, centralized initiative to define coherent and meaningful strategy to maintain and develop relevant energy modelling expertise.
    - Andre Bernier: “nimble, efficient and well integrated in Canadian efforts, appropriated to existing institutional infrastructure”.
- Consistency is key for the effectiveness of EMI activities: hence, there should be dedicated resources to ensure the permanence of the initiative.

7. Appendix: EMI National Forum: Official Agenda and Participants

National Forum – December 17 and 18th, 2019

Holliday Inn & Suite Centre-Ville Ouest, 1390 René-Lévesque Blvd W, Montreal, Quebec H3G 0E3

Discussing the Draft Long-Term Proposal of the Energy Modelling Initiative (EMI)

Preliminary Agenda

Day 1 – December 17, 2019

Time	Activity	Purpose
8h30	Registration and Breakfast	
9h00	Opening and Introduction - Madeleine McPherson, EMI - André Bernier, NRcan - Moe Esfahlani, EMI	Provide background and context for this initiative; Lay out the plan and expectations for the two days.
9h25	Workshops Outcome 1: The Political and economic potential of applied modelling With: - Andrew Rowe (Western) - Lindsay Miller-Branovacki, Rupp Carriveau (Central) - David Foord (Atlantic)	Present workshops outcomes organized around those questions: - What policy makers, utilities and others needs were identified in regional workshops that can be addressed through modelling? - Which stakeholders were identified that could benefit from this initiative? - What kinds of practical decisions can energy modelling address? - What are the values that this initiative could create for the stakeholders? - What are the requirements for such an initiative to succeed?
10h10	Draft Proposal Presentation - Normand Mousseau, EMI	Present the draft proposal that will be discussed during the Forum.
10h30	Break	

10h45	Panel 1: The context and expectations for the proposed initiative from various institutions' perspective Panelists: - Patrick Bateman, WaterPower Canada - André Bernier, NRCan - Lorne Johnson, Ivey Foundation - Étienne St-Cyr, Hydro-Québec - Thomas Williams, Manitoba Ministry of Conservation and Climate Moderator: Louis Beaumier, EMI	Understand how potential model users see the EMI proposal: - How do you think this initiative can help/impact your organisation? - How would you see your organisation working with this initiative? - What do you like best with this initiative in terms of mandate/structure? - What do you think could be improved? - Any other issues/problems/questions?
12h00	Lunch	
13h00	Presentations: Linkage with other initiatives With: - Mary Beth Garneau, CCEI - Dale Beugin, CICC	Learn about two other related federal government initiatives - Canadian Center for Energy Information (CCEI) - Canadian Institute for Climate Choices (CICC)
13h30	Panel 2: The institutional and intellectual ecosystem of the proposed initiative Panelists: - Jocelyn Millette, CanmetENERGY-Varennes - Katya Rhodes, University of Victoria - Ralph Torrie, Sustainability Solutions Group - Bryce van Sluys, Canadian Energy Regulator - Mary Beth Garneau, CCEI - Dale Beugin, CICC Moderator: Madeleine McPherson, EMI	Understand the place of EMI in the ecosystem. - How do you think this initiative links with your organisation? - How does the initiative fit in the modelling/policy ecosystem? - What do you like best with this initiative in terms of mandate/structure? - What do you think could be improved? - Any issues/problems/questions?
14h45	Break	

15h00	Breakout 1: Vision, Mission and Strategy
	
	Moderated discussions on the draft proposal
		Further refine the proposal.
		
		- Aspects and issues to be considered in the mission and related strategic elements and activities:
		  - What other essential issues need to be addressed in the mission statement that are currently missing?
		  - Does the proposed structure and strategic elements support the mission?
		  - What other elements of the structure need to be reflected or prioritized in the mission?
		- Other stakeholders of such an initiative:
		  - What value/services do they seek that this initiative has to offer?
		  - What value/services can they add to the initiative?

16h00	Plenary 1: Vision, Mission and Strategy Summary of discussions by table moderators	Summary of table discussion and other comments.
16h45	Closing remarks	Summary and takeaways from the day.
17h00	Cocktail Dinner Courtesy of the Trottier Family Foundation	

Day 2 – December 18, 2019

Time	Activity	Purpose
8h30	Registration and Breakfast	
9h00	Opening Moe Esfahlani, EMI	
9h15	Modelling Presentations 1. Interactions of policies acting at the local, regional, and national scales for Canada's Energy transition – Simon Fraser University, Canadian Energy & Emissions Data Centre 2. Management of Canada's energy transition and associated risks through optimized CGE approach – URegina, SK Ministry of Environment 3. An open source Energy Transition Tool for Canada Energy Sectors toward Deep Decarbonisation Pathway Projects – Hydro-Québec Research Institute (IREQ) 4. Examining the contribution of hydroelectric renewal and greenfield development to grid decarbonization: An enhanced capacity expansion model – Uvictoria, Utoronto 5. Pumped Hydro Storage (PHS) and Battery Energy Storage Systems (BESS): An Assessment of Energy 2020 Initial Response and Identification of Possible Improvements – Environment and Climate Change Canada 6. Hourly Electricity Projections from Canada's Energy Future 2019 – Canada Energy Regulator	Present a sample of the variety and richness of energy modelling in Canada, its relevance and its value for policy and decision making. Guiding questions: - Where does the model fit within the broader spectrum? - What type of decision making does the model inform? - What is the range of data that the model uses? - How can the model be developed? NOTE: presentations will be stopped at the 10-minute mark
10h30	Break	
11h00	Modelling Presentations (continued) 7. Modeling Increased Electric Vehicle Charging Demand on Greenhouse Gas Emissions in Quebec and Ontario – UQAM, Joint Clean Climate Transport Research Partnership 8. CityInSight – Spatially resolved modelling of energy and emissions in Canadian municipalities – Whatif? Technologies, Sustainability Solutions Group 9. A Cluster-Based load Model for a Resilient and Sustainable Community – Uwaterloo, Qualsys Engco Inc. 10. Smart Microgrid Solutions to Reducing Fossil Fuels Dependence in Canada's Rural and Remote Communities – Unew Brunswick	Idem

	11. Modelling of remote diesel-based power systems and equipment in the Canadian Territories – Yukon College 12. Near real-time modelling and smart Management of electricity consumption – Polytechnique Montreal, CIRAIG	
12h00	Lunch	
13h00	Workshop Outcomes 2 Scope of the Proposed Initiative and the Modellers' Perspective With: - Andrew Rowe (Western) - Lindsay Miller-Branovacki, Rupp Carriveau (Central) - David Foord (Atlantic)	Present workshops outcomes concerning these questions: - What are the benefits, opportunities, challenges and prospects of the proposed EMI for modellers? - What components/requirements should be included in a shared platform for energy systems modelling in Canada? - How can a shared platform lead to synergies and encourage collaboration? - What should the relationship/fit between the shared platform and proposed initiative look like?

13h30	Breakout 2: Towards a Shared Platform
	
	Moderated discussions on the draft proposal
		Refine the proposal by pursuing the following questions:
		
		- What are the crucial technical aspects for (a) the proposed initiative and (b) the shared platform (data, software, protocols)?
		- What does your interaction with (a) the proposed initiative and (b) the shared platform look like (providing data, software, offering services, etc.)?
		- What are the needs from your point of view?
		  - Which ones are not met with the proposed initiative?
		  - By what mean should we address that?

14h30	Towards a Shared Platform / Plenary 2 Summary of discussions by table moderators	Summary of table discussions; Other steps to be taken beyond the proposal.
15h15	Closing Remarks	Summary and takeaways from the day; List the next steps for EMI.
15h30	End of Forum	

Registered participants

Name	Organization
Reza Arjmand	University of Victoria
Laurent Aubin	Ministère de l'Énergie et Ressources naturelles
Viviane Aubin	Polytechnique Montréal
Olivier Bahn	GERAD – HEC Montréal
Patrick Bateman	WaterPower Canada
Louis Beaumier	Institut de l'énergie Trottier
Ariane Benoît	Polytechnique Montréal
André Bernier	Natural Resources Canada
Michel Bernier	Polytechnique Montréal
Dale Beugin	Canadian Institute for Climate Choices
Julien Bourque	Canadian Institute for Climate Choices
Steve Bresee	Canadian Association of Petroleum Producers
Thomas Budd	SFU Canadian Energy and Emissions Data Centre (CEEDC)
Guy Buller	CanmetENERGY
Bo Cao	University of New Brunswick
Richard Carlson	Pollution Probe
Kevin Caron	Canadian Energy Regulator
Pierre-Olivier Caron-Périgny	Hydro-Québec
Rupp Carriveau	University of Windsor
Milla Craig	Millani Inc.
Thomas Dandres	Polytechnique Montréal
Ken Darcovich	National Research Council of Canada
Cécile Darviot	Polytechnique Montréal
Runa Das	Royal Roads University
Sébastien Debia	Groupe d'études et de recherche en analyse de décisions
Veronique Delisle	Natural Resources Canada
Alexandre Deslauriers	Hydro-Québec
Chris Diduch	University of New Brunswick
Ganesh Doluweera	Canadian Energy Research Institute
Moe Esfahlani	Institut de l'énergie Trottier
Ann Evans	WSP
Allan Fogwill	Canadian Energy Research Institute
David Foord	University of New Brunswick
Samuel Forget Lord	Institut 15uébécois du carbone
Ahmed Gaouda	QualSys Engco Inc
Mary Beth Garneau	Canadian Centre for Energy Information, Statistics Canada
Sébastien Girard Lindsay	Initiative Énergie Positive, Université d'Ottawa

Name	Organization
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Ali Hajebrahimi	Hydro-Québec/IREQ
Matthew Hansen	Canada Energy Regulator
Richard Hendriks	University of Toronto
Yuill Herbert	Sustainability Solutions Group
Christina Hoicka	York University
Hossein Hosseini	Smart Prosperity Institute
Lorne Johnson	Ivey Foundation
Mary Kaye	University of New Brunswick
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Madeleine McPherson	University of Victoria
Cristobal Miller	Natural Resources Canada
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Peter Wild	University of Victoria
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8. Resources

For more information about the EMI national forum, including presentation slides and list of participants, please visit the following Energy Modelling Initiative's Website:

https://emi-ime.ca/national-forum/

For more information about regional workshops, including synthesis reports, agendas, presentation slides and lists of participants, please visit the following pages:

Central Workshop: https://emi-ime.ca/central-workshop/

Western Workshop: https://emi-ime.ca/western-workshop/

Eastern Workshop: https://emi-ime.ca/atlantic-workshop/